

CLAIMS

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1. A method for computing an FFT, the method comprising:
- 5 (a) receiving a plurality of first data values, said first data values having a total of N-data points;
- (b) storing in a first memory each of said plurality of first data values;
- (c) providing in a second memory a plurality of twiddle factors stored in sequential locations in a bit reversed
- 10 order;
- (d) reading R input butterfly data values of said plurality of first data values where each of said R butterfly data values are separated by N/R first data values in said plurality of first data values;
- 15 (e) performing a radix R butterfly calculation on said R butterfly input data;
- (f) providing R butterfly output data values;
- (g) sequentially storing said R butterfly output data values in a third memory;
- 20 (h) performing said steps (c) - (g) N/R x 2 times.
2. The method as in claim 1 further comprising the steps of:
- replacing said plurality of first data values in said
- 25 first memory with said plurality of data in said second memory location;
- repeating steps (c) - (h) a total of  $\log_r(n) \times$  times.
3. The method as in claim 1, wherein  $R=2$ .
- 30 4. The method as in claim 1, wherein said  $R=4$ .

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5. An apparatus for calculating an FFT, the apparatus comprising:

5 a first memory for storing a plurality of N input data values, said plurality of N input data values being stored sequentially in a time-ordered manner;

a second memory for storing a plurality of twiddle factor values in a bit-reversed order;

10 a third memory for storing a plurality of output data values; and

15 a radix R FFT calculator coupled to said first, second, and third memories, said radix R FFT being operative to receive from said first memory, R input data values, each of the R input data values being separated by N/R input data values, said radix R FFT calculator further being operative to receive at least one twiddle factor value from said second memory, and said radix R FFT calculator further being operative to calculate R output data values and to write said R output data values sequentially into said third  
20 memory.

6. The apparatus of claim 5 wherein R equals 2.

25 7. The apparatus of claim 5 wherein R equals 4.

8. A DSP apparatus for performing an FFT calculation comprising:

30 a DSP operative to receive a plurality of first data values, said first data values having a total of N-data points;

said DSP operative to provide in a second memory a plurality of twiddle factors stored in sequential locations in a bit reversed order;

10        said DSP operative to perform a radix R butterfly  
calculation on said R butterfly input data;

15       said DSP operative to sequentially store said R  
butterfly output data values in a third memory.